

V. Ford

1600

RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/763,397A

DATE: 10/05/2001

TIME: 13:41:09

Input Set : A:\ES.txt

Output Set: N:\CRF3\10052001\I763397A.raw

3 <110> APPLICANT: The Government of the United States of America, as represented by the
4 Secretary of the Department of Health and Human Services, Centers for Disease
5 Control and Prevention
6 Lal, Altaf A.
7 Ping Shi, Ya
8 Hasnain, Seyed E.
10 <120> TITLE OF INVENTION: Recombinant Multivalent Malarial Vaccine Against Plasmodium
Falciparum

12 <130> FILE REFERENCE: 6395-57049
14 <140> CURRENT APPLICATION NUMBER: 09/763,397A
15 <141> CURRENT FILING DATE: 2001-02-16
17 <150> PRIOR APPLICATION NUMBER: US 60/097,703
18 <151> PRIOR FILING DATE: 1998-08-21
20 <150> PRIOR APPLICATION NUMBER: PCT / US99/18869
21 <151> PRIOR FILING DATE: 1999-08-19
23 <160> NUMBER OF SEQ ID NOS: 26
25 <170> SOFTWARE: PatentIn version 3.1
27 <210> SEQ ID NO: 1
28 <211> LENGTH: 1053
29 <212> TYPE: DNA
30 <213> ORGANISM: Artificial Sequence
32 <220> FEATURE:
33 <223> OTHER INFORMATION: Recombinant DNA/Protein
35 <220> FEATURE:
36 <221> NAME/KEY: CDS
37 <222> LOCATION: (1)..(1053)
38 <223> OTHER INFORMATION:

ENTERED

41 <400> SEQUENCE: 1
42 atg aaa ttc tta gtc aac gtt gcc ctt gtt ttt atg gtc gtg tac att 48
43 Met Lys Phe Leu Val Asn Val Ala Leu Val Phe Met Val Val Tyr Ile
44 1 5 10 15
46 tct tac atc tat gcg gat cat cat cat cat cat aaa cat aaa aaa 96
47 Ser Tyr Ile Tyr Ala Asp His His His His His His Lys His Lys Lys
48 20 25 30
50 tta aag caa cca ggg gat ggt aat cct tgg tcc cca tgt agt gta act 144
51 Leu Lys Gln Pro Gly Asp Gly Asn Pro Trp Ser Pro Cys Ser Val Thr
52 35 40 45
54 tgt gga aaa cct aaa gac gaa tta gat tat gaa aat gat att gaa aaa 192
55 Cys Gly Lys Pro Lys Asp Glu Leu Asp Tyr Glu Asn Asp Ile Glu Lys
56 50 55 60
58 aaa att tgt aaa atg gaa aaa tgt tcc agt gtg ttt aat gtc gta aat 240
59 Lys Ile Cys Lys Met Glu Lys Cys Ser Ser Val Phe Asn Val Val Asn
60 65 70 75 80
62 agt aat tct gga tgt ttc aga cat tta gat gaa aga gaa gaa tgt aaa 288
63 Ser Asn Ser Gly Cys Phe Arg His Leu Asp Glu Arg Glu Glu Cys Lys
64 85 90 95
66 tgt tta tta gaa gat tca ggt agc aac gga aag aaa atc aca tgt gaa 336
67 Cys Leu Leu Glu Asp Ser Gly Ser Asn Gly Lys Lys Ile Thr Cys Glu

RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/763,397A

DATE: 10/05/2001

TIME: 13:41:09

Input Set : A:\ES.txt

Output Set: N:\CRF3\10052001\I763397A.raw

```

68          100          105          110
70 tgt act aaa cct gat tct aag cct att gtg caa tat gac aat ttc aat      384
71 Cys Thr Lys Pro Asp Ser Lys Pro Ile Val Gln Tyr Asp Asn Phe Asn
72          115          120          125
74 gca aac cca aac gca aac ccc aat gca aat cct gat gga aat tgt gaa      432
75 Ala Asn Pro Asn Ala Asn Pro Asn Ala Asn Pro Asp Gly Asn Cys Glu
76          130          135          140
78 gat ata cca cat gta aat gaa ttt tca gca att gat ctt gga aat gct      480
79 Asp Ile Pro His Val Asn Glu Phe Ser Ala Ile Asp Leu Gly Asn Ala
80 145          150          155          160
82 gaa aaa tat gat aaa atg gat gaa cca caa cat tat ggg aaa tca ctc      528
83 Glu Lys Tyr Asp Lys Met Asp Glu Pro Gln His Tyr Gly Lys Ser Leu
84          165          170          175
86 act cca tta gaa gaa tta tat aaa cca aat gat aaa agt ttg tat cag      576
87 Thr Pro Leu Glu Glu Leu Tyr Lys Pro Asn Asp Lys Ser Leu Tyr Gln
88          180          185          190
90 tat ata aaa gca aat tct aaa ttt ata ggt ata act gaa cta agc aac      624
91 Tyr Ile Lys Ala Asn Ser Lys Phe Ile Gly Ile Thr Glu Leu Ser Asn
92          195          200          205
94 aca ttc ata aac aat gct gga caa cat gga cat atg cat ggt aac gag      672
95 Thr Phe Ile Asn Asn Ala Gly Gln His Gly His Met His Gly Asn Glu
96          210          215          220
98 agg gaa gat gag aga acg ctt act aag gaa tat gaa gat att gtt ttg      720
99 Arg Glu Asp Glu Arg Thr Leu Thr Lys Glu Tyr Glu Asp Ile Val Leu
100 225          230          235          240
102 aaa gag ttt aca tat atg ata aac ttt gga aga gga cag aat tat tgg      768
103 Lys Glu Phe Thr Tyr Met Ile Asn Phe Gly Arg Gly Gln Asn Tyr Trp
104          245          250          255
106 gaa cat cca tat caa aaa agt gat caa cct aaa caa tat gaa caa cat      816
107 Glu His Pro Tyr Gln Lys Ser Asp Gln Pro Lys Gln Tyr Glu Gln His
108          260          265          270
110 tta aca gat tat gaa aaa att aaa gaa ggt aag ccc ttg gat aaa ttt      864
111 Leu Thr Asp Tyr Glu Lys Ile Lys Glu Gly Lys Pro Leu Asp Lys Phe
112          275          280          285
114 gga aat atc tat gat tat cac tat gag cat tct agt cca tct agt aca      912
115 Gly Asn Ile Tyr Asp Tyr His Tyr Glu His Ser Ser Pro Ser Ser Thr
116          290          295          300
118 aag tca tca agt cca tca aat gta aaa tca gct agt cta gct aca aga      960
119 Lys Ser Ser Ser Pro Ser Asn Val Lys Ser Ala Ser Leu Ala Thr Arg
120 305          310          315          320
122 tta atg aaa aaa ttt aaa gct gaa atc aga gat ttc ttc ggt ata agt      1008
123 Leu Met Lys Lys Phe Lys Ala Glu Ile Arg Asp Phe Phe Gly Ile Ser
124          325          330          335
126 tat tat gaa aag gtt tta gcg aaa tat aag gat gat tta gaa tag      1053
127 Tyr Tyr Glu Lys Val Leu Ala Lys Tyr Lys Asp Asp Leu Glu
128          340          345          350
131 <210> SEQ ID NO: 2
132 <211> LENGTH: 350
133 <212> TYPE: PRT

```

RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/763,397A

DATE: 10/05/2001

TIME: 13:41:09

Input Set : A:\ES.txt

Output Set: N:\CRF3\10052001\I763397A.raw

```

134 <213> ORGANISM: Artificial Sequence
136 <220> FEATURE:
137 <223> OTHER INFORMATION: Recombinant DNA/Protein
139 <400> SEQUENCE: 2
141 Met Lys Phe Leu Val Asn Val Ala Leu Val Phe Met Val Val Tyr Ile
142 1          5          10          15
145 Ser Tyr Ile Tyr Ala Asp His His His His His Lys His Lys Lys
146          20          25          30
149 Leu Lys Gln Pro Gly Asp Gly Asn Pro Trp Ser Pro Cys Ser Val Thr
150          35          40          45
153 Cys Gly Lys Pro Lys Asp Glu Leu Asp Tyr Glu Asn Asp Ile Glu Lys
154          50          55          60
157 Lys Ile Cys Lys Met Glu Lys Cys Ser Ser Val Phe Asn Val Val Asn
158 65          70          75          80
161 Ser Asn Ser Gly Cys Phe Arg His Leu Asp Glu Arg Glu Glu Cys Lys
162          85          90          95
165 Cys Leu Leu Glu Asp Ser Gly Ser Asn Gly Lys Lys Ile Thr Cys Glu
166          100         105         110
169 Cys Thr Lys Pro Asp Ser Lys Pro Ile Val Gln Tyr Asp Asn Phe Asn
170          115         120         125
173 Ala Asn Pro Asn Ala Asn Pro Asn Ala Asn Pro Asp Gly Asn Cys Glu
174          130         135         140
177 Asp Ile Pro His Val Asn Glu Phe Ser Ala Ile Asp Leu Gly Asn Ala
178 145         150         155         160
181 Glu Lys Tyr Asp Lys Met Asp Glu Pro Gln His Tyr Gly Lys Ser Leu
182          165         170         175
185 Thr Pro Leu Glu Glu Leu Tyr Lys Pro Asn Asp Lys Ser Leu Tyr Gln
186          180         185         190
189 Tyr Ile Lys Ala Asn Ser Lys Phe Ile Gly Ile Thr Glu Leu Ser Asn
190          195         200         205
193 Thr Phe Ile Asn Asn Ala Gly Gln His Gly His Met His Gly Asn Glu
194          210         215         220
197 Arg Glu Asp Glu Arg Thr Leu Thr Lys Glu Tyr Glu Asp Ile Val Leu
198 225         230         235         240
201 Lys Glu Phe Thr Tyr Met Ile Asn Phe Gly Arg Gly Gln Asn Tyr Trp
202          245         250         255
205 Glu His Pro Tyr Gln Lys Ser Asp Gln Pro Lys Gln Tyr Glu Gln His
206          260         265         270
209 Leu Thr Asp Tyr Glu Lys Ile Lys Glu Gly Lys Pro Leu Asp Lys Phe
210          275         280         285
213 Gly Asn Ile Tyr Asp Tyr His Tyr Glu His Ser Ser Pro Ser Ser Thr
214          290         295         300
217 Lys Ser Ser Ser Pro Ser Asn Val Lys Ser Ala Ser Leu Ala Thr Arg
218 305         310         315         320
221 Leu Met Lys Lys Phe Lys Ala Glu Ile Arg Asp Phe Phe Gly Ile Ser
222          325         330         335
225 Tyr Tyr Glu Lys Val Leu Ala Lys Tyr Lys Asp Asp Leu Glu
226          340         345         350
229 <210> SEQ ID NO: 3

```

RAW SEQUENCE LISTING

DATE: 10/05/2001

PATENT APPLICATION: US/09/763,397A

TIME: 13:41:09

Input Set : A:\ES.txt

Output Set: N:\CRF3\10052001\I763397A.raw

```

230 <211> LENGTH: 16
231 <212> TYPE: PRT
232 <213> ORGANISM: Plasmodium falciparum
234 <400> SEQUENCE: 3
236 Lys Pro Leu Asp Lys Phe Gly Asn Ile Tyr Asp Tyr His Tyr Glu His
237 1          5          10          15
240 <210> SEQ ID NO: 4
241 <211> LENGTH: 12
242 <212> TYPE: PRT
243 <213> ORGANISM: Plasmodium falciparum
245 <400> SEQUENCE: 4
247 Asn Ala Asn Pro Asn Ala Asn Pro Asn Ala Asn Pro
248 1          5          10
251 <210> SEQ ID NO: 5
252 <211> LENGTH: 13
253 <212> TYPE: PRT
254 <213> ORGANISM: Plasmodium falciparum
256 <400> SEQUENCE: 5
258 Lys His Lys Lys Leu Lys Gln Pro Gly Asp Gly Asn Pro
259 1          5          10
262 <210> SEQ ID NO: 6
263 <211> LENGTH: 23
264 <212> TYPE: PRT
265 <213> ORGANISM: Plasmodium falciparum
267 <400> SEQUENCE: 6
269 Lys Pro Lys Asp Glu Leu Asp Tyr Glu Asn Asp Ile Glu Lys Lys Ile
270 1          5          10          15
273 Cys Lys Met Glu Lys Cys Ser
274          20
277 <210> SEQ ID NO: 7
278 <211> LENGTH: 21
279 <212> TYPE: PRT
280 <213> ORGANISM: Plasmodium falciparum
282 <400> SEQUENCE: 7
284 Asp Ile Glu Lys Lys Ile Cys Lys Met Glu Lys Cys Ser Ser Val Phe
285 1          5          10          15
288 Asn Val Val Asn Ser
289          20
292 <210> SEQ ID NO: 8
293 <211> LENGTH: 9
294 <212> TYPE: PRT
295 <213> ORGANISM: Plasmodium falciparum
297 <400> SEQUENCE: 8
299 Trp Ser Pro Cys Ser Val Thr Cys Gly
300 1          5
303 <210> SEQ ID NO: 9
304 <211> LENGTH: 9
305 <212> TYPE: PRT
306 <213> ORGANISM: Plasmodium falciparum

```

RAW SEQUENCE LISTING

DATE: 10/05/2001

PATENT APPLICATION: US/09/763,397A

TIME: 13:41:09

Input Set : A:\ES.txt

Output Set: N:\CRF3\10052001\I763397A.raw

```

308 <400> SEQUENCE: 9
310 Lys Pro Ile Val Gln Tyr Asp Asn Phe
311 1 5
314 <210> SEQ ID NO: 10
315 <211> LENGTH: 8
316 <212> TYPE: PRT
317 <213> ORGANISM: Plasmodium falciparum
319 <400> SEQUENCE: 10
321 Lys Pro Asn Asp Lys Ser Leu Tyr
322 1 5
325 <210> SEQ ID NO: 11
326 <211> LENGTH: 18
327 <212> TYPE: PRT
328 <213> ORGANISM: Plasmodium falciparum
330 <400> SEQUENCE: 11
332 Asn Ser Gly Cys Phe Arg His Leu Asp Glu Arg Glu Glu Cys Lys Cys
333 1 5 10 15
336 Leu Leu
340 <210> SEQ ID NO: 12
341 <211> LENGTH: 19
342 <212> TYPE: PRT
343 <213> ORGANISM: Plasmodium falciparum
345 <400> SEQUENCE: 12
347 Glu Asp Ser Gly Ser Asn Gly Lys Lys Ile Thr Cys Glu Cys Thr Lys
348 1 5 10 15
351 Pro Asp Ser
355 <210> SEQ ID NO: 13
356 <211> LENGTH: 17
357 <212> TYPE: PRT
358 <213> ORGANISM: Plasmodium falciparum
360 <400> SEQUENCE: 13
362 Gly Ile Ser Tyr Tyr Glu Lys Val Leu Ala Lys Tyr Lys Asp Asp Leu
363 1 5 10 15
366 Glu
370 <210> SEQ ID NO: 14
371 <211> LENGTH: 8
372 <212> TYPE: PRT
373 <213> ORGANISM: Plasmodium falciparum
375 <400> SEQUENCE: 14
377 Ser Asn Thr Phe Ile Asn Asn Ala
378 1 5
381 <210> SEQ ID NO: 15
382 <211> LENGTH: 8
383 <212> TYPE: PRT
384 <213> ORGANISM: Plasmodium falciparum
386 <400> SEQUENCE: 15
388 Gly Gln His Gly His Met His Gly
389 1 5
392 <210> SEQ ID NO: 16

```

VERIFICATION SUMMARY

DATE: 10/05/2001

PATENT APPLICATION: US/09/763,397A

TIME: 13:41:10

Input Set : A:\ES.txt

Output Set: N:\CRF3\10052001\I763397A.raw